

**DETAILED ACTION**

***Claim Objections***

1. Claim 35 is objected to because of the following informalities: the phrase, "at least one openings" should be "opening". Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 27-48 are rejected under 35 U.S.C. 102(b) as being anticipated by Thaysen et al. (Cantilever-Based Bio-Chemical Sensor Integrated in a Microliquid Handling System).

Regarding claim 27, Thaysen et al. discloses a chemical sensor (Abstract) comprising at least one sensor unit (p402/Fabrication, see: cantilevers), a primary (p402/Fabrication, see: silicon nitride layer) and a secondary substrate (p402/Fabrication, see: Epon SU-8), the primary substrate comprises a primary cavity and a primary connecting surface at least partly surrounding said cavity (p402/Fabrication, see: channel), the at least one sensor unit is in the form of cantilevers, each comprising a piezoresistive element (p402/Fabrication, see: cantilevers with poly-silicon resistors), said at least one sensor unit is protruding from the primary substrate and into the cavity of said primary substrate (Fig. 4), the

piezoresistive element or elements being electrically connected to primary connecting pads on the primary connecting surface, the secondary substrate comprises secondary connecting pads corresponding to the primary connecting pads, on a secondary connecting surface corresponding to the primary connecting surface, said primary connecting surface and said secondary connecting surface being mounted to each other so that said primary connecting pads and said secondary connecting pads are directly mounted to each other (p402/Fabrication, see: aluminum for the electrical contacts; Fig. 3(g), see: Metal for contact).

Regarding claim 28, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the sensor has one cantilever protruding from the primary substrate, the primary connecting surface of the primary surface totally surrounds the primary cavity, and the secondary substrate comprises an opening through the substrate to provide access to the cantilever (Fig. 5, see: inlets/outlets).

Regarding claim 29, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the sensor has at least two cantilevers, each cantilever has its own primary cavity, the primary connecting surface of the primary surface totally surrounds the cavities of the primary surface, and the secondary substrate comprises openings through the substrate to provide access to the cantilevers (Fig. 1, see: inlets/outlets).

Regarding claim 30, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the primary cavity is in the form of a

primary channel section, said primary channel section extending perpendicular to the protruding direction of at least one cantilever (Fig. 5, see: side-view)

Regarding claim 31, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the primary connecting surface is constituted by the surface along the lengthwise borders of the primary channel section (Fig. 1, see: contact pads around the entire channel).

Regarding claim 32, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the primary connecting surface is constituted by the surface along all of the borders of the primary channel section (Fig. 1, see: contact pads around the entire channel).

Regarding claim 33, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the secondary substrate comprises a secondary channel corresponding to the primary channel so that the primary and the secondary channels together form a flow channel section (Fig. 3(h), see: Epon SU-8 used to define upperpart of the channel walls).

Regarding claim 34, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the flow channel section is closed except from an inlet in one of its ends and an outlet in the other one of its ends (Fig. 1, see: inlets/outlets).

Regarding claim 35, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the flow channel section comprises at least

one openings through either the primary or the secondary substrate (Fig. 1, see: inlets/outlets).

Regarding claim 36, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the primary channel section is in the form of an oblong cavity, the secondary substrate comprises an oblong opening corresponding to the primary channel section, the primary connecting surface surrounding the primary channel section and the secondary connection surface along the oblong opening being mounted to each other to form a flow channel section (Fig. 4, see: lower channel part (primary channel section) and top part of channel wall (secondary substrate)).

Regarding claim 37, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the sensor comprises at least two cantilevers protruding from the primary substrate along the length of the primary channel section (Fig. 5, see: side-view).

Regarding claim 38, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the primary connecting surface comprises a barrier line extending partly or totally around the primary cavity, said barrier line being in the form of a barrier line selected from the group of a) a barrier wall, b) a barrier ditch and c) both a barrier wall and a barrier ditch (Fig. 4, see: wall formed at connecting surface between the lower etched silicon and the Epon SU-8 channel wall).

Regarding claim 39, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the secondary connecting surface

comprises a cavity or an opening in the secondary substrate, said secondary substrate further comprising a barrier line extending at least partly around the cavity or at least partly around the opening in the secondary substrate (Fig. 4, see: wall formed at connecting surface between the lower etched silicon and the Epon SU-8 channel wall).

Regarding claim 40, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the primary and the secondary connection surfaces are sealed in a liquid tight sealing (p402/Fabrication, see: laminating or gluing techniques leaving a perfectly sealed channel).

Regarding claim 41, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the liquid tight sealing comprises materials are chosen from metal, polymer, glue and mixtures thereof (p402/Fabrication, see: laminating or gluing techniques leaving a perfectly sealed channel).

Regarding claim 42, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the liquid tight sealing is at least partly provided by soldering (p402/Fabrication, see: aluminum is deposited on the wafer).

Regarding claim 43, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the liquid tight sealing is at least partly provided by underfilling (Fig. 3(h), see: SU-8).

Regarding claim 44, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the secondary substrate is of a ceramic material (p402/Fabrication, see: silicon nitride).

Regarding claim 45, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the secondary substrate is a printed circuit board (Fig. 1, see: deposited aluminum patterned for the electrical connections).

Regarding claim 46, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the secondary substrate is a micro chip (Fig. 1, see: deposited aluminum patterned for the electrical connections).

Regarding claim 47, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses said primary substrate is based on silicon, said primary cavity being in the form of an etched cavity forming a recess under at least one cantilever (Fig. 4, see: lower channel part is etched in silicon).

Regarding claim 48, Thaysen et al. discloses all of the claim limitations as set forth above. Thaysen et al. further discloses the sensor comprises a grounded electrode to ground the potential of a conductive fluid in at least one of the cavities of the primary substrate (p403/Applications, see: Wheatstone bridge).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT EOM whose telephone number is (571)270-7075. The examiner can normally be reached on Mon.-Thur., 9:00am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571)272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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